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Title: Pathogen Light: Fluorescent Probe for Rapid Foodborne Bacteria Detection

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LA-UR-



## REQUEST FOR INFORMATION

### Pathogen Light: Fluorescent Probe for Rapid Foodborne Bacteria Detection

Developing new testing agents and schemes for fast testing for food safety

According to CDC, 1 in 6 Americans (or 48 million people) gets sick each year due to foodborne illness. Among them, there are 3,000 deaths. Foodborne bacteria is the NO.1 contributor for that. The direct and indirect costs associated with illnesses caused by major foodborne pathogens are estimated at \$15.6 billion per year. Current technologies like culturing and PCR, which are considered as the gold standards, do not meet the fast testing demand requirements in the food supply chain. Pathogen light is a set of reagents and fluorescence probes that can identify foodborne pathogenic DNA in minutes rather than days.



## AREAS FOR PARTNERSHIP

The Los Alamos team has identified areas for partnership and/or exclusive or nonexclusive, commercial licensing to advance the pathogen light technology. Los Alamos has initiated work on these topics. A collaboration with an academic, industrial, and commercialization partners could accelerate added functionality that includes:

- Validating and integrating pathogen light with existing industrial standards for foodborne bacteria detection.
- Joint collaboration development in fluorescent color based simultaneous detection of major foodborne bacteria including Salmonella, Listeria, and E. coli.
- Any other application of interest.

Please submit a written response to the contact below if your organization would like to pursue the technology in partnership with Los Alamos by

### CONTACT:



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## WHY WE NEED **PATHOGEN LIGHT**

The current detection methods for foodborne bacteria are not only time-consuming (several business days), but also add another layer of hazards to the food supply chain as methods like culturing need to grow and enrich bacteria. Therefore, they are time and labor intensive and not safe to operate on site.



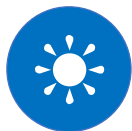
## WHAT'S BEHIND OUR **TECHNOLOGY**

Pathogen light is based on Los Alamos National Laboratory's R&D 100 award winning technology (Nanocluster Beacon for DNA detection). This technology provides a new way for rapid detection of DNA. Compared with culturing method, pathogen light bypasses the time consuming incubation step and offers real-time detection readouts for foodborne pathogenetic DNA. This technology has been tested successfully on six diseases in the laboratory environment. As requirements for food safety testing expands due to the recent implementation of FDA Food Safety Modernization Act, pathogen light is expected to contribute to the preventative measure of foodborne bacteria contamination and ensure 100% safe food for customers.



## OUR **COMPETITIVE ADVANTAGES**

- Cost Effective
- Rapid Detection
- Complementary to PCR
- Safe
- Easy to Use
- Real-Time Readouts



## WHAT'S UNIQUE ABOUT OUR **SOLUTION**

Our solution offers:

- A new way of foodborne bacteria detection with real time readouts
- Integratable and complementary to existing detection methods
- Simultaneous detection of multiple foodborne bacteria



## OUR **TECHNOLOGY STATUS**

Our technology is based on DNA detection. Each foodborne bacterium has its own unique DNA sequence within the genome. Currently, we have identified ~500 unique DNA sequences for *Listeria monocytogenes*. New fluorescence "turn-on" probes are being developed targeting all *Listeria* strains. Over next 6-8 months, Similar approaches will be made towards salmonella and toxic strains of *E. coli*. Multiplex testing of different bacteria DNA will be incorporated into paper based testing strips for field based detection experiments and validated with existing gold standards in 2020.



## **PUBLICATIONS AND IP**

There are three patents for nanocluster based fluorescence probes

US Patent 7,914,588

US Patent 8,476,014

US Patent 9,499,866